made use of. The criticism that we would make is that, while Professor Hobhouse's exposition is just as a general statement, it may leave the impression that in relation to immediate social questions racial problems are of little importance. Professor Hobhouse does not himself belittle the importance of racial qualities but some readers might be tempted to belittle them. There is clear evidence that racial qualities are deteriorating and there is thus good cause for seeking immediately and directly to mend the position. Our chances of bringing ultimately into being an excellent society may otherwise recede below the horizon. In other words it is not enough to rely upon the ultimate success of our long and painful groping towards a more excellent state of things. Little enough can be done in any generation and there is good reason for holding that to this generation falls the immediate task of amending social organisation so as to check deterioration. If the efforts of this generation are not turned that way progress may well be made elsewhere but such progress may not go far enough to preserve that biological foundation upon the basis of which alone a successful solution can be achieved.

A.M.CARR-SAUNDERS.

**More, Louis Trenchard.** Professor of Physics, University of Cincinatti. *The Dogma of Evolution*. London. Oxford University Press. Pp. 387. Price 16s.

THIS book consists as its title indicates of a series of lectures delivered before the University of Princeton. They consitute the most thoughtful and scholarly criticism of the Darwinian theory of evolution which we have ever encountered and are well worthy of the attention of all serious students of that theory.

In the introduction Prof. More expresses himself as follows: "With what is now known to have been a pitifully meagre supply of facts, observations and experiments, the Darwinians preached the gospel of evolution as an established scientific law and crushed all opposition to natural selection by hurling the anathema that if you did not believe you were not fit to survive." He says that as a result of this discussion the phenomena of life were studied systematically and that the outcome of this investigation has been that the evidence available supports our faith in a general law of evolutiom. But on the other hand the causes and method of evolution have become a matter of such doubt that the better biologists themselves admit that they are not on the track of any satisfactory proofs.

That the teaching of Darwinian evolution was accompanied, first in England and later in America by what can only be termed bluff must be admitted. Of course no one would attribute bluff to Darwin himself, but merely to his followers. But it was defended and is being defended in America by minds with a narrower and less philosophic training than those who fought for it in England. As Prof. More forcibly points out, even leading American biologists like Prof. Conklin do not see when they say "that natural selection is the only satisfactory theory of evolution" that natural selection or the removal of the unfit is no explanation of evolution at all. What is needed is an

explanation of the nature and course of variation which is the real driving force behind evolution. The American evolutionists then go on to regard the mechanical conception of life as the mere result of the mutual positions of molecules as the only "scientific one." They deplore the "vitalism" of Driesch, one of our greatest European biologists and regard his views as the renunciation of the attempts at an explanation. In England, even Huxley, when brought face to face with the enormous difficulties involved in a materialistic philosophy frankly abandoned that philosophy and adopted an idealistic position when he said ' I cannot conceive of Matter apart from Mind to picture it in. Most of the American biologists are not even able to see these difficulties. Prof. More shows that neither the Greeks nor the Mediæval Church had any conception at all analogous to evolution and that his countryman Prof. Osborne was wrong in supposing that they had. He says that this idea only began to arise when the true nature of fossils was realised, for until this time there was no reason to suppose that all the existing species of animals and plants had not come into being simultaneously." This all important discovery he attributes, apparently with justice, to that weird genius Leonardo da Vinci.

Prof. More then comes to discuss Lamarck and gives well deserved praise to that pioneer of evolution. He blames Lamarck however for postulating a "Sublime Author" who fixed an order in Nature of which evolution has been the outcome. Of course Lamarck in this was only voicing the Deistic philosophy of his time. Prof. More is scathing on the misconceptions of Mr. Elliot, Lamarck's translator, who from lack of biological knowledge utterly fails to understand Lamarck. Prof. More intimates that if proof were forthcoming Lamarck's theory would be acceptable, but he evidently wrote this in ignorance of the experiments of Kammerer and Durkhen which supply exactly the proof which he desiderates. He says however with justice, that the opposition to Lamarckism arises not mainly from lack of experimental data, but from the fact that the cause which Lamarck assigns for evolution viz., the striving of the creature to satisfy its needs and the consequent increase of function and enlargement of organs is a vitalistic and not a mechanistic one.

When Prof. More comes to discuss Darwin himself he points out that if the interests of truth are to be saved, the extravagant eulogy of Darwin's followers must be discounted. While yielding to none in his admiration for the lovableness of Darwin's character and for his patience as an experimenter and observer, he asserts that Darwin was deficient in philosophical logic and devoid of mathematical logic, and that the problem of life was so gigantic a task as to require for its solution not merely an immense collection of facts, but a genius which he asserts that Darwin did not possess. More states that Adam Sedgwick the great geologist wrote to Darwin that he had taken the generally known law of change or transformation and had narrowed it down to a specific mode of variation unsupported by an adequate body of facts and had written of natural selection as if it were done consciously by a selecting agent, he omits to say however that Darwin explicitly stated that he spoke figuratively and

endeavoured to guard himself against misconception. Prof. More says that Darwin arrived at the idea of natural selection when he was 29 and spent all the rest of his life trying to prove his theory true, so that he worked deductively and not inductively, and that now everyone of his arguments is contradicted by facts. Prof. More, however, fails to note that there is no getting away from the fact that the majority of the offspring of every organism perish prematurely and that only the most vigorous survive, so that the action of natural selection as a pruning knife cannot be denied. Nor does he understand the Darwinian idea of the "struggle for existence." This is not as he supposes an internecine fight between members of the same species for the bare necessities of existence; but a struggle in which all the capacities are sharpened to find food and to escape enemies.

Passing to De Vries and his mutation theory, which is indeed the foundation of the so-called Mendelian explanation of evolution, Prof. More says that this idea that the change of species proceeds by jumps is destructive of scientific theory as it does away with the whole conception of continuity which should be the basis of a theory of evolution. No one he says—if mutations are the cause of evolution—can predict future events because no one can say how great mutations may be. Prof. More's criticism has been justified by the publication of Willis's Age and Area which is the "reductio ad absurdum" of the whole mutation idea, and is indeed the reinstatement of the old doctrine of special creation in different words. We are now, it seems to us, within sight of finding environmental causes for these mutations and these causes are such as to show that mutations have not played any part in evolution. Mutations, it is true, are the basis on which the experimental breeder of domesticated animals proceeds; but strains so produced revert when removed to natural conditions, as Prof. More justly points out, and it is regrettable that Darwin regarded these strains as analogous to natural races.

Prof. More then takes up the mechanistic view of life—that is the view that what we call life is merely the result of the spatial arrangement of certain atoms and molecules. Here he has the mechanists at his mercy, for as a professor of physics he is pitilessly severe on the bad physics and worse chemistry of the mechanistic biologists. In America the mechanistic view is rampant, in England and Europe generally it is being silently abandoned by the more thoughtful biologists. Sir Charles Sherrington himself has stated that if we could construct a machine which would act like an adult organ we should still have no conception how this machine is built up out of the formless germ or how mind inserts itself in matter. But every one who knows anything of the present state of experimental biology knows how utterly impossible the mechanistic view is. The idea of "regulation" which is one of the vitalistic conceptions of Driesch is now employed by all the workers in this field and this idea is incompatible with any mechanistic hypothesis whatever.

The most interesting chapters of the book to Eugenists are those in which Prof, More deals with the bearing of Darwinism on Society and Religion. It seems to us that he fails to understand both Eugenics and

Malthus." If the fittest alone survive," he says, "then all existing individuals are fit to survive and the Eugenists' worry about Jukes and the imbeciles is futile." But Eugenists say that if in human society natural selection were allowed full play the Jukes family would be mercilessly wiped out; it is because philanthropy interferes with natural selection that this family becomes a menace. More says that since Matlhus's time the rate of increase of population has been decreasing and the food-supply has been increasing geometrically till there has arisen the anti-Malthusian cry for more production of children. It is true that since the death of Malthus new areas of the world have been exploited for the production of food, but the world is after all a limited place and we are rapidly approaching its limits. The wheat-fields of America have almost reached the limit of exploitation: those of Canada will last a century or so longer and then we shall face the real struggle. A friend of ours who formerly occupied an important administrative post in India told us that when he went to Bengal there was only one district in which the people were prosperous and that was a district in which a recent inundation had drowned 700,000 people in twenty minutes. More goes on to say that recent experience has completely belied the hopes and prophecies of Herbert Spencer as to the continued progress of the human race: that no new moral facts had been discovered and that science in undermining religion is destroying the basis of civilization. The ninetenth century biologists, he says, retained a morality bred in them by generations of religious ancestors, but now that morality is disappearing. Further, he says that the idea of the necessary progress of humanity is chimerical, only a few stocks having shown themselves capable of improvement, and the mere fact that inferior races can be taught to handle the implements of cilization does not in any way improve them. History, he says, proves that mankind does not advance by natural selection but by the sporadic appearance of great teachers and the enormous effect of these on their fellow humans.

There is much in Prof. More's contentions to give serious matter for thought apart from all question of the amount of truth contained in it; religion is a biological phenomena coterminous with mankind; all previous civilizations have been founded on religion and the Russian experiment does not encourage the belief that our civilization can get on without it. But although it is true that great teachers overtower their contemporaries, still these contemporaries who have attained their qualities by their long struggle with the environment, constitute the soil from which the heroes sprung; it is not an accident that Jesus was born a Jew, or that Buddha first saw the light in Northern India.

Prof. More has done a real service in showing how baseless are the hasty conceptions of Herbert Spencer, Buckle and their contemporaries, but the history of civilization, not as interpreted by Buckle, but by Elliot Smith, shows that all greatness and force of character have sprung from the courage and enterprise called forth by the successful struggle with Nature.

E. W. MacBride.